Approved Supplemental Mathematics Reference Sheet—Grade 10

ONLY for use by students on the MCAS Mathematics test who have this accommodation listed in their IEP or 504 plan

General Problem-Solving Process	Properties

1. Read/reread the problem for understanding.
2. Identify what the question is asking.
3. Make a plan to solve the problem. (*Choose at least one strategy.*)
    • Draw a picture.
    • Create a table, chart, or list.
    • Look for a pattern.
    • Work backwards.
    • Write a number sentence or an equation.
4. Solve the problem.
5. Reread the problem to see if your solution makes sense.
	• $a \cdot (b + c) = a \cdot b + a \cdot c$
	
	• $a + (b + c) = (a + b) + c$
	
	• $a \cdot (b \cdot c) = (a \cdot b) \cdot c$
	
	• $a + b = b + a$
	
	• $a \cdot b = b \cdot a$
	
	• $a - (-b) = a + b$
	
	• $a + (-b) = a - b$
	
	• FOIL
	
	  $(a + b)(c + d) = ac + ad + bc + bd$
	
	<table><tr><td></td><td>a</td><td>b</td></tr><tr><td>c</td><td>ac</td><td>bc</td></tr><tr><td>d</td><td>ad</td><td>bd</td></tr></table>

Fractions	Vocabulary
• $\dfrac{a}{b} + \dfrac{c}{d} = \dfrac{ad+bc}{bd}$ • $\dfrac{a}{b} - \dfrac{c}{d} = \dfrac{ad-bc}{bd}$ • $\dfrac{a}{b} \cdot \dfrac{c}{d} = \dfrac{ac}{bd}$ • $\dfrac{a}{b} \div \dfrac{c}{d} = \dfrac{ad}{bc}$	• $factor \cdot factor = product$ • $dividend \div divisor = quotient$ • $\dfrac{numerator}{denominator}$

Divisibility Rules	Order of Operations
<table><tr><td>2</td><td>If the last digit is even</td></tr><tr><td>3</td><td>If the sum of the digits can be divided by 3</td></tr><tr><td>5</td><td>If the last digit is 0 or 5</td></tr><tr><td>6</td><td>If the number is divisible by both 2 and 3</td></tr><tr><td>9</td><td>If the sum of the digits can be divided by 9</td></tr><tr><td>10</td><td>If the last digit is 0</td></tr></table>	**PEMDAS** 1. **P**arentheses (brackets, etc.) 2. **E**xponents 3. **M**ultiplication or **D**ivision (left to right) 4. **A**ddition or **S**ubtraction (left to right) **GEMA** 1. **G**rouping 2. **E**xponents 3. **M**ultiplicative operations (multiplication or division – left to right) 4. **A**dditive operations (addition or subtraction – left to right)

Probability	Percentages and Proportions
• Probability $= \frac{favorable\ outcomes}{possible\ outcomes}$	• $\frac{is}{of} = \frac{\%}{100}$ • $x\% = \frac{x}{100}$ • if $\frac{a}{b} = \frac{c}{d}$, then $ad = bc$

Statistics	Transformations
• Mean - Average • Median - Middle • Mode – Most often • Range – Least to Greatest	• Translation - Slide • Reflection - Flip • Rotation - Turn

Geometry and Measurement Abbreviations	Symbols
• $l =$ length • $w =$ width • $h =$ height • $s =$ length of a side • $b =$ length of the base • $r =$ radius • $d =$ diameter • $A =$ area • $B =$ area of the base • $P =$ perimeter • $C =$ circumference • $M =$ midpoint	• $<$ is less than • $>$ is greater than • $=$ is equal to • $|x| =$ absolute value of x • $\leq$ is less than or equal to • $\geq$ is greater than or equal to • $\neq$ is not equal to • $\approx$ is approximately equal to • $\cong$ is congruent to • $\sim$ is similar to • $\parallel$ is parallel to • $\perp$ is perpendicular to

Number Line

Angles

• Complementary 90	• Supplementary 180

General Formulas	Coordinate Plane
• $\pi \approx 3.14$ • $a^2 + b^2 = c^2$ • $d = rt$ $d$istance $= r$ate $\cdot\ t$ime • $I = prt$ Interest $= p$rincipal $\cdot\ r$ate $\cdot\ t$ime • $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	• $Ax + By = C$ • Slope or Rate of Change $(m) = \dfrac{y_2 - y_1}{x_2 - x_1} = \dfrac{Rise}{Run}$ • $y = mx + b$ • $y - y_1 = m(x - x_1)$ • Midpoint $(M) = \left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2}\right)$ • Distance $(d) = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$